In the Claims:

1. (Currently Amended). A method of examining tissue in order to differentiate ~~it~~ the examined tissue from other tissue according to the dielectric properties of the examined tissue, comprising:

applying an electrical pulse to the tissue to be examined via a probe formed with an open cavity such that the probe generates an electrical fringe field in ~~the~~ examined tissue within said cavity and produces a reflected electrical pulse therefrom with negligible radiation penetrating into other tissues or biological bodies near the examined tissue;

detecting said reflected electrical pulse;

and comparing electrical characteristics of said reflected electrical pulse with respect to said applied electrical pulse to provide an indication of the dielectric properties of said examined tissue.

2. (Currently Amended). The method according to Claim 1, wherein said probe has an inner conductor insulated from, and enclosed by, an outer conductor open at one end; said outer conductor extending ~~slightly~~ past said inner conductor in the axial direction of the probe to define ~~an~~ said open cavity at one end of the probe, which cavity is closed by the examined tissue.

3. (Original). The method according to Claim 2, wherein said inner conductor includes a tip within said open cavity, which tip is formed with at least two different diameters for enhancing said electrical fringe field.

4. (Currently Amended). The method according to Claim ~~2~~ 3, wherein said tip of the inner conductor carries a plurality of thin, electrically-conductive projections for enhancing said electrical fringe field.

5. (Original). The method according to Claim 4, wherein the thickness of said projections is up to about 200 microns.

6. (Currently Amended). A method of examining tissue in order to differentiate ~~it~~ the examined tissue from other tissue according to the dielectric properties of the examined tissue, comprising:

providing a probe having an inner conductor insulated from, and enclosed by, an outer conductor open at one end and extending ~~slightly~~ past the inner conductor in the axial direction, to define an open cavity at one end of the probe;

applying said probe to the tissue to be examined such that the examined tissue closes said open cavity at said one end of the probe;

applying, via a transmission line at the opposite end of said probe, an electrical pulse which generates an electrical fringe field in said cavity closed by said examined tissue, and which produces a reflected electrical pulse therefrom;

detecting said reflected electrical pulse;

and comparing electrical characteristics of said reflected electrical pulse with respect to those of said applied electrical pulse to provide an indication of the dielectric properties of said examined tissue.

7. (Original). The method according to Claim 6, wherein the inner conductor includes a tip within said open cavity, which tip is formed with at least two different diameters for enhancing said electrical fringe field.

8. (Original). The method according to Claim 7, wherein said tip of the inner conductor carries a plurality of thin electrically-conductive projections for enhancing said electrical fringe field.

9. (Original). The method according to Claim 8, wherein the thickness of said projections is up to about 200 microns.

10. (Currently Amended). The method according to Claim 6, wherein said outer conductor decreases on diameter at the end thereof defining said open cavity.

11. (Original). The method according to Claim 6, wherein changes in the time-domain characteristics of the applied and reflected electrical pulses are compared.

12. (Currently Amended). The method according to Claim 6, wherein the electrical characteristics of the reflected electrical pulse are compared with those of the applied electrical pulse by sampling both electrical pulses at a plurality of spaced time intervals, and comparing ~~the~~ voltage magnitudes of the two electrical pulses at said spaced time intervals.

13. (Original). The method according to Claim 12, wherein:

samples of the two electrical pulses at said plurality of spaced time intervals are transformed by a FFT function to values in the frequency domain of amplitude and phase for each frequency;

and the reflection coefficient $\Gamma(\omega)$ is then calculated in the frequency domain according to the following equation:

$\Gamma(\omega)=E(\omega)$reflected/$E(\omega)$ incident

wherein: "$E(\omega)$ reflected" is a Fourier function with respect to ω(frequency) of the reflected electrical pulse; and

"$E(\omega)$ incident" is a corresponding function of the applied electrical pulse.

14. (Original). The method according to Claim 13, wherein the impedance of the examined tissue is calculated from the reflection coefficient $\Gamma(\omega)$ according to the following equation:

$$\Gamma(\varpi) = \frac{Z_1 - Z_0}{Z_1 + Z_0}$$

wherein: Z1 is the impedance of the examined tissue; and Z0 is the impedance of the probe and of the transmission line.

15. (Original). The method according to Claim 7, wherein said transmission line is a coaxial cable having an outer conductor connected to the outer conductor of the probe, and an inner conductor connected to the inner conductor of the probe.

16. (Original). The method according to Claim 7, wherein said applied electrical pulse is of a duration of the order of nanoseconds or picoseconds.

17. (Original). The method according to Claim 16, wherein a series of said electrical pulses are applied at a pulse repetition rate of a few Herz to a few giga-Herz, and the reflected electrical pulses are detected and compared to the applied electrical pulses to provide an indication of the dielectric properties of the examined tissue.

18. (Original). The method according to Claim 6, wherein the dielectric properties of the examined tissue are compared with previously stored dielectric properties of known normal and cancerous tissues.

19. (Currently Amended). The method according to Claim 6, wherein the dielectric properties of the examined tissue are compared with previously stored dielectric properties of known normal and cancerous tissues to constitute a first level of characterization of the examined tissue; and wherein a second level of characterization of the examined tissue is effected to reduce ambiguities by comparing the Cole-Cole parameters of the examined tissue with those previously stored of known normal and cancerous tissues.

20. (Original). The method according to Claim 19, wherein a third level of characterization of the examined tissue is effected to further reduce ambiguities by

comparing similarities between three-dimensional curves of the examined tissue with those previously stored of known normal and cancerous tissues.

21. (Currently Amended). A system for examining tissue in order to differentiate ~~it~~ the examined tissue from other tissue according to ~~the~~ dielectric properties of the examined tissue, comprising:

a probe having an inner conductor insulated from, and enclosed by, an outer conductor open at one end and extending ~~slightly~~ past the inner conductor in the axial direction, to define an open cavity at one end of the probe;

a transmission line at the opposite end of said probe;

a pulse generator for applying to the opposite end of said probe an electrical pulse which generates an electrical fringe field in said cavity closed by said examined tissue and produces a reflected electrical pulse ~~therefrom~~ form the examined tissue;

a detector for detecting said reflected electrical pulse;

and a data processor for comparing electrical characteristics of said reflected electrical pulse with respect to said applied electrical pulse to produce an indication of the dielectric properties of said examined tissue.

22. (Original). The system according to Claim 21, wherein said inner conductor includes a tip within said open cavity, which tip is formed with at least two different diameters for enhancing said electrical fringe field.

23. (Currently Amended). The system according to Claim 22, wherein said tip of the inner conductor carries ~~of~~ a plurality of thin, electrically-conductive projections for enhancing said electrical fringe field.

24. (Original). The system according to Claim 23, wherein the thickness of said projections is up to about 200 microns.

25. (Original). The system according to Claim 21, wherein said outer conductor decreases in diameter at said open cavity end.

26. (Original). The system according to Claim 21, wherein said data processor compares changes in the time-domain characteristics of the two electrical pulses.

27. (Currently Amended). The system according to Claim 21, wherein said data processor samples both electrical pulses at a plurality of spaced time intervals, and compares ~~the~~ voltage magnitudes of the two electrical pulses at said spaced time intervals.

28. (Currently Amended). The system according to Claim ~~21~~ 27, wherein:

said data processor transforms ~~the~~ samples of the two electrical pulses at said plurality of spaced time intervals by a FFT function to values in the frequency domain of amplitude and phase for each frequency;

and then calculates the reflection coefficient $\Gamma(\omega)$ in the frequency domain according to the following equation:

$\Gamma(\omega)$=E(ω)reflected/E(ω) incident

wherein: "E(ω) reflected" is a Fourier function with respect to ω(frequency) of the reflected signal; and

"E(ω) incident" is a corresponding function of the applied signal.

29. (Original). The system according to Claim 28, wherein said data processor calculates the impedance of the examined tissue according to the following equation:

$$\Gamma(\varpi) = \frac{Z_1 - Z_0}{Z_1 + Z_0}$$

wherein: Z1 is the impedance of the examined tissue; and Z0 is the impedance of the probe and of the transmission line.

30. (Original). The system according to Claim 21, wherein said transmission line is a coaxial cable having an outer conductor connected to the outer conductor of the probe, and an inner conductor connected to the inner conductor of the probe.

31. (Original). The system according to Claim 21, wherein said pulse generator generates and applies an electrical pulse of a duration of the order of nanoseconds or picoseconds.

32. (Currently Amended). The system according to Claim 21, wherein:

said pulse generator generates and applies a series of said electrical pulses at a pulse repetition rate of a few Herz to a few giga-Herz;

said detector detects the reflected electrical pulses;

and said data processor compares the reflected electrical ~~pules and compares them to~~ pulses with the applied electrical pulses to provide an indication of the dielectric properties of the examined tissue.

33. (Original). The system according to Claim 21, wherein said outer conductor is of cylindrical configuration.

34. (Original). The system according to Claim 21, wherein said inner conductor is mounted within said outer conductor by a dielectric material.

35. (Original). The system according to Claim 34, wherein said dielectric material is a fluorinated ethylene polymer.

36. (Original). The system according to Claim 21, wherein said data processor compares the dielectric properties of the examined tissue with previously stored dielectric properties of known normal and cancerous tissues.

37. (Original). The system according to Claim 21, wherein said data processor first compares dielectric properties of the examined tissue with previously stored dielectric properties of known normal and cancerous tissues in a first level of characterization of the examined tissue; and then effects a second level of characterization of the examined to reduce ambiguities by comparing the Cole-Cole parameters of the examined tissue with those previously stored for the various types of normal and cancerous tissues.

38. (Original). The system according to Claim 37, wherein said data processor effects a third level of characterization of the examined tissue to further reduce ambiguities by comparing similarities between three-dimensional curves of the examined tissue with those previously stored for the various types of normal and cancerous tissues.